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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/671,201	09/28/2000	Michiaki Sano	07553.0009	9091

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FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP
1300 I STREET, NW
WASHINGTON, DC 20005

EXAMINER	
VINH, LAN	
ART UNIT	PAPER NUMBER
1765	

DATE MAILED: 08/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/671,201	SANO, MICHIAKI	
	Examin r	Art Unit	
	Lan Vinh	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *41-51 and 60-73* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *71-73* is/are allowed.

6)☒ Claim(s) *41-51 and 60-70* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Continued Prosecution Application

1. The request filed on 6/27/2003 for a Request for Continued Examination (RCE) under 37 CFR 1.114 based on parent Application No. 09/671201 is acceptable and a RCE has been established. An action on the RCE follows.

Claim Objections

2. In line 1 of claim 69, the term "ort" appears to be a typographical error, the examiner suggests replacing "ort" with -to -.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 41-45 are rejected under 35 U.S.C. 102(e) as being anticipated by Ou-Yang et al (US 6,379,574).

Ou-Yang discloses a plasma dielectric etching process to remove a photoresist layer/film 58 covering a layer 56 formed on a semiconductor substrate 50/workpiece placed within a plasma etch chamber, the layer 56 has an opening 60 and polymer

portion/fence portion 62 extending toward the upper portion of opening 60. This process comprises the steps of:

applying RF/high frequency power for biasing to the substrate at 150 W/first power level (col 8, lines 20-22, fig.9)

generating/raising the processing gas (oxygen) to a plasma (col 7, lines 1-3)

partially removing the photoresist when no bias power is applied to the substrate (col 7, lines 16-27), which reads on switching the high frequency power for biasing applied to the workpiece from the first power level to the second power level lower than the first power level before the photoresist film becomes completely removed

Regarding claim 42, Ou-Yang discloses that the polymer potion/fence portion 62 is removed when applying RF bias power at 150 W/first power level (col 8, lines 20-31)

Regarding claim 43, Ou-Yang discloses that no bias power/second power level is applied after the step of removing the polymer/fence portion (col 8, lines 44-65)

Regarding claim 44, Ou-Yang discloses that the layer 56 is silicon dioxide (col 6, lines 22-23)

Regarding claim 45, Ou-Yang discloses forming photoresist layer 58 on the substrate (col 6, lines 7-8), which reads on forming an organic film at the workpiece.

5. Claims 46-48 are rejected under 35 U.S.C. 102(e) as being anticipated by Ou-Yang et al (US 6,379,574).

Ou-Yang discloses a plasma dielectric etching process to remove a photoresist layer/film 58 covering a layer 56 formed on a semiconductor substrate 50/workpiece placed within a plasma etch chamber. This process comprises the steps of:

etching the dielectric layer 56 (col 6, lines 12-13)

applying RF/high frequency power for biasing to the substrate at 150 W/first power level to remove the polymer potion/fence portion 62 extending toward the upper portion of opening 60 formed in the dielectric layer 56 during etching (col 8, lines 20-31) (col 8, lines 20-22, fig.9)

generating/raising the processing gas (oxygen) to a plasma (col 7, lines 1-3)

partially removing the photoresist when no bias power is applied to the substrate (col 7, lines 16-27), which reads on switching the high frequency power for biasing applied to the workpiece from the first power level to the second power level lower than the first power level before the photoresist film becomes completely removed

Regarding claim 47, Ou-Yang discloses that the layer 56 is silicon dioxide (col 6, lines 22-23)

Regarding claim 48, Ou-Yang discloses forming photoresist layer 58 on the substrate (col 6, lines 7-8), which reads on forming an organic film at the workpiece

6. Claims 49-51, 60-62 are rejected under 35 U.S.C. 102(e) as being anticipated by Ou-Yang et al (US 6,379,574).

Ou-Yang discloses a plasma dielectric etching process to remove a photoresist layer/film 58 covering a layer 56 formed on a semiconductor substrate 50/workpiece placed within a plasma etch chamber, the photoresist film has an opening area than an opening area of a hole formed in layer 56 (fig. 7). This process comprises the steps of:

applying RF/high frequency power for biasing to the substrate at 150 W (col 8, lines 20-22, fig.9)

generating/raising the processing gas (oxygen) to a plasma (col 7, lines 1-3)

removing the photoresist when applying the RF bias power to the substrate during the post-etch treatment step (col 8, lines 34-36), which reads on ashing the photoresist film while applying the high-frequency power for biasing to the workpiece

following the post-etch treatment, performing a cleaning step when no bias power is applied during the cleaning step (col 8, lines 44-65), which reads on after the ashing step, stopping application of the high-frequency power for biasing before the photoresist film becomes completely removed. Ou-Yang also discloses using oxygen gas before and after stopping applying the bias power (col 8, lines 44-51)

Regarding claims 50, 61, Ou-Yang discloses using the photoresist as a mask to form a pattern at an silicon dioxide layer 56 formed on the semiconductor substrate 50 (fig.7)

Regarding claims 51, 62, Ou-Yang discloses using photoresist 58 as a mask to form a pattern at an anti-reflective coating layer 54/organic film formed on the semiconductor substrate 50 (fig.7)

7. Claims 66-70 are rejected under 35 U.S.C. 102(e) as being anticipated by Ou-Yang et al (US 6,379,574).

Ou-Yang discloses a plasma dielectric etching process to remove a photoresist layer/film 58 covering a layer 56 formed on a semiconductor substrate 50/workpiece

placed within a plasma etch chamber, the photoresist film has an opening area than an opening area of a hole formed in layer 56 (fig. 7). This process comprises the steps of:

generating/raising the processing gas (oxygen) to a plasma (col 7, lines 1-3)

applying RF/high frequency power for biasing to the substrate at 150 W (col 8, lines 20-22, fig.9)

partially removing the photoresist when no bias power is applied to the substrate using oxygen gas in a flushing step(col 7, lines 16-27, fig. 7 shows that the photoresist is substantially removed with the polymer 62/fence portion), which reads on removing the photoresist film substantially halfway with the fence portion and thereafter stopping application of the biasing power with the photoresist film remaining

subsequently performing a cleaning step using oxygen plasma (col 8, lines 44-46), which reads on removing the photoresist completely while utilizing the same processing gas as the processing gas for removing the photoresist substantially halfway

Regarding claim 67, Ou-Yang discloses that the polymer potion/fence portion 62 is removed when applying RF bias power at 150 W/first power level (col 8, lines 20-31)

Regarding claim 68, Ou-Yang discloses that no bias power/second power level is applied after the step of removing the polymer/fence portion (col 8, lines 44-65)

Regarding claim 69, Ou-Yang discloses that the layer 56 is silicon dioxide (col 6, lines 22-23)

Regarding claim 70, Ou-Yang discloses forming photoresist layer 58 on the substrate (col 6, lines 7-8), which reads on forming an organic film at the workpiece.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 63-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tohda (US 6,04,114) in view of Ou-Yang et al (US 6,379,574)

Tohda discloses a method for plasma etching comprises the steps of:

etching a film using a resist layer/film 7 as a mask (col 5, lines 13-15)

removing the resist film 7 substantially halfway when applying bias power (col 4, lines 37-39 , fig. 1(g))

fig. 1(h) shows that resist film 7 is completely removed

Unlike the instant claimed invention as per claim 63, Tohda fails to disclose removing the remaining photoresist completely without applying any biasing power.

However, Ou-Yang discloses a plasma dielectric etch process comprises the step of removing the photoresist completely when no bias power is applied .

Since Tohda is concerned with the step of removing the photoresist completely, one skilled in the art would have found it obvious to modify Tohda's method by peforming the step of completely removing the photoresist without applying any bias power as per Ou-Yang because Ou-Yang states that no bias power is typically during the flushing step to totally remove the photoresist (col 7, lines 16-28)

Regarding claim 64, fig. 1(f) of Tohda shows that resist layer 7 forms a pattern on an oxide layer 2.

Regarding claim 65, Tohda discloses that the ARC/organic film is etched to produce a pattern (col 5, lines 36-37)

Allowable Subject Matter

10. Claims 71-73 are allowed.

The following is an examiner's statement of reasons for allowance:

Regarding claim 71, the cited prior art of record fails to disclose the step of stopping application of the biasing power with the photoresist film remaining after removing a fence portion while applying biasing power to the workpiece. The closest cited prior art of Ou-Yang (US 6,379,574) discloses the step of stopping application of the biasing power during the cleaning step after removing a fence portion and any residual photoresist remaining while applying biasing power to the workpiece during the post-etch treatment step (col 8, lines 8-65)

Response to Arguments

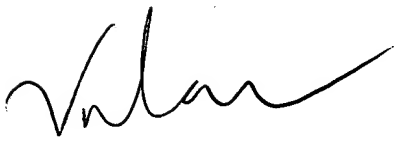
11. Applicant's arguments with respect to claims 41-51, 60-73 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 703 305-6302. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 703 305-2667. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872-9310 for regular communications and 703 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0661.



LV
August 7, 2003